UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
ELALLAM, AHMED

ART UNIT	PAPER NUMBER
2416	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/764,692	CHERITON, DAVID R.
	Examiner	Art Unit	
	AHMED ELALLAM	2416	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>04 June 2009</u>.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1,4-13,29,31-38,48,50-54,60,62-68 and 70</u> is/are pending in the application.

    4a) Of the above claim(s) <u>67, 68 and 70</u> is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1, 4-13, 29, 31-38, 48, 50-54, 60, 62-66</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is responsive to Amendment filed on 06/04/2009. Group I was

elected for prosecution. Claims 1, 4-13, 29, 31-38, 48, 50-54, 60, 62-66, 67,68 and 70

are pending. Claims 67, 68 and 70 are withdrawn.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1, 4-5, 8-10, 13, 29, 32-33, 36-38, 48, 51-52, 60 and 64 are rejected

under 35 U.S.C. 103(a) as being unpatentable over Liu et al, 2002/0146016 A1.

Hereinafter referred to as Liu.

      Regarding claim 1, with reference to figures, 1, 2 and 4, Liu discloses a first

gateway 114 (claimed network device) comprising:

      an output port, (an output port is inherently present at the gateway because that

is needed to output packet into tunnel 110c), see paragraph [0016], [0037],

      a cache 118, (claimed a memory coupled to the output port);

      the output port is configured to output packets for transmission via a network

tunnel, see paragraph [0016], [0037];

the cache for storing packets awaiting acknowledgement from gateway 116 , the cash including an outbound packet queue 128 that maintain copies of (or pointers to) packets transmitted by the first gateway 114 to the second gateway 116 that have not been acknowledged by the second gateway 116. See paragraphs [0019], [0023], and [0026]. (Claimed memory is configured to store information, and the information identifies packets which have been forwarded via the network tunnel).

Liu also discloses that the outbound packet queue 128 maintain copies of packets transmitted by the first gateway 114 to the second gateway 116 that have not been acknowledged by the second gateway 116. See paragraph [0023]. it is inherent to have a controller in the first gateway of Liu connected to the outbound queue and to the cache because that is required to process the required information for transmitting and receiving packets and to check for acknowledgments and for managing the queues and other component of the gateway. In addition, Liu discloses an outbound packet counter 126 for counting the number of packet outstanding in the tunnel, see figure 4, unit 124. Further, Liu with reference to figure 2, shows tunnel traffic comprising TCP/UDP and **Other** traffic. (The existence of TCP/UDP and other traffic within the tunnel implies different flows within the tunnel). (Claimed the tunnel aggregating a plurality of flows).

Liu also discloses an outbound packet counter 126 for counting the number of packet outstanding in the tunnel, see figure 4, unit 124, this feature along the different traffic flows within the tunnel, in combination with the feature of maintaining copies of packets transmitted by the first gateway 114 reads on the claimed the *"queue" indicates how many packets in each of the flows are outstanding within the network tunnel).*

The difference between Liu and the claimed subject matter is that the claimed subject matter specifies a memory and a queue that are separately claimed, however Liu discloses the cache (gateway cache, see figure 2) having both the information about the outstanding packets in the tunnel as well as the queues for storing the packets.

It would have been obvious to have a the cache of Liu consist of a memory separate from the queues, such as shared memory, and a common queue of all outstanding packets in the tunnel so that available tunnel bandwidth at the ingress side can be easily determined, and subsequent tunnel reservation can be allocated fairly among contending flows.

Regarding claim 4, Liu discloses the first gateway 114 update its session layer cache by removing acknowledged packets from the first cache 118. (Claimed memory is comprised in the control unit; and the control unit is configured to update the information in the memory to indicate that the packet was sent via the network tunnel, in response to forwarding the packet to the output port).

Regarding claim 5, Liu discloses the cache for having copies of transmitted packets awaiting acknowledgements. (A packet copied for possible retransmission is implicitly sent to awaiting queue since it awaits retransmission in accordance with other packets awaiting retransmission).

Regarding claims 8 and 9 and 10, Liu discloses a particular packet included in the outbound packet queue 128 is acknowledged, the packet can be removed from the outbound packet queue 128. (Claimed the control unit is configured to forward the copy of the packet stored in the queue to the output port for retransmission via the network

tunnel if the packet is dropped in the network tunnel as in claim 8 and claimed control

unit is configured to determine that the packet was dropped in the network tunnel in

response to the information stored in the memory and in response to information

received from another network device, as in claim 9 and sending the copy of the packet

stored in the queue via the network tunnel if the copy of the packet is dropped in the

network tunnel, as in claim 10).

Regarding claim 13, Liu discloses congestion control algorithms such as

congestion avoidance algorithm. (Claimed forwarding a new packet to the output port

for transmission via the network tunnel if no packets have been transmitted via the

network tunnel for a period of time).

Regarding claim 29, with reference to figures, 1, 2 and 4, Liu discloses a method

comprising:

sending a packet via a network tunnel from a first gateway 114, see paragraph

[0016], [0037], (claimed first network device); and a cache 118 for storing packets

awaiting acknowledgement from gateway 116, the cash including an outbound packet

queue 128 that maintain copies of (or pointers to) packets transmitted by the first

gateway 114 to the second gateway 116 that have not been acknowledged by the

second gateway 116. See paragraphs [0019], [0023], and [0026]. (Claimed determining

whether the packet is dropped in the network tunnel).

Liu also discloses an outbound packet counter 126 for counting the number of

packet outstanding in the tunnel, see figure 4, unit 124. Further, Liu with reference to

figure 2, shows tunnel traffic comprising TCP/UDP and **Other** traffic. (The existence of

TCP/UDP and other traffic implies within the tunnel implies the aggregation of different flows within the tunnel). (Claimed the queue indicates how many packets the flows are outstanding within the network tunnel). Liu also discloses an outbound packet counter 126 for counting the number of packet outstanding in the tunnel, see figure 4, unit 124, this feature along the different traffic flows within the tunnel, in combination with the feature of maintaining copies of packets transmitted by the first gateway 114 reads on the claimed the *queue indicates how many packets in each of the flows are outstanding within the network tunnel*).

Liu also discloses an outbound packet counter 126 for counting the number of packet outstanding in the tunnel, see figure 4, unit 124, this feature along the different traffic flows within the tunnel, in combination with the feature of maintaining copies of packets transmitted by the first gateway 114 reads on the claimed the *"queue" indicates how many packets in each of the flows are outstanding within the network tunnel*).

The difference between Liu and the claimed subject matter is that the claimed subject matter specifies a memory and a queue that are separately claimed, however Liu discloses the cache (gateway cache, see figure 2) having both the information about the outstanding packets in the tunnel as well as the queues for storing the packets.

It would have been obvious to have a the cache of Liu consist of a memory separate from the queues, such as shared memory, and a common queue of all outstanding packets in the tunnel so that available tunnel bandwidth at the ingress side can be easily determined, and subsequent tunnel reservation can be allocated fairly among contending flows.

Regarding claim 32 and 51, Liu discloses a cache 118 for storing packets awaiting acknowledgement from gateway 116 , the cash including an outbound packet queue 128 that maintain copies of (or pointers to) packets transmitted by the first gateway 114 to the second gateway 116 that have not been acknowledged by the second gateway 116. See paragraphs [0019], [0023], and [0026]. (Claimed removing the copy of the packet from the queue if the determining whether the packet is dropped in the network tunnel determines that the packet was successfully received at an egress of the network tunnel, as in claims 32 and 51, because acknowledged packet need to be removed for providing queue capacity for other incoming packets).

Regarding claim 33, the cache of Liu for storing packets awaiting acknowledgement from gateway 116, the cash including an outbound packet queue 128 that maintain copies of (or pointers to) packets transmitted by the first gateway 114 to the second gateway 116 that have not been acknowledged by the second gateway would be sent if not acknowledged within a period of time. (Claimed sending the copy of the packet from the queue via the network tunnel if the packet is dropped in the network tunnel).

Regarding claim 36, Liu discloses storing packets awaiting acknowledgement from gateway 116 , the cash including an outbound packet queue 128 that maintain copies of (or pointers to) packets transmitted by the first gateway 114 to the second gateway 116 that have not been acknowledged by the second gateway 116. See paragraphs [0019], [0023], and [0026]. (Claimed sending information to the first network device, wherein the information indicates whether the packet was dropped in the

network tunnel).

Regarding claims 37 and 38, with regard to figure 2, Liu shows an inbound packet queue at the receiving gateway for storing received packets it is implicit to Liu to move packets out of the queue after processing based on earlier sequence number of the packets so to make the queue available for other incoming packets. (claimed storing the packet in a queue if the packet is received out of sequence by a second network device as in claim 37 and removing the packet from the egress queue in response to receiving at least one packet via the network tunnel, wherein the at least one packet is earlier in a sequence of packets than the packet; and forwarding the packet in response to the removing the packet from the queue, as in claim 38).

Regarding claims 48, 52, claims 48, 52 are means claims and have substantially the same scope of respective method claims 29 and 33, thus they are subject to similar rejections.

Regarding claims 60, 64, claims 60, and 64 are computer readable medium claims comprising program instructions executable to implement the method of respective method claims 29, and 33. Liu discloses implementing the method as indicated above with regard to claims 29, and 33, using executable instructions embedded in a computer readable medium, see paragraph [0078] and claim 8.

4.   Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Le Gouriellec et al US 20030112756A1. Hereinafter referred to as Gouriellec.

Regarding claim 6 and 7, Liu while disclosing flow control (Liu, paragraph [0028]), it does not explicitly specify identifying a flow that comprises a particular packet, and the control unit is configured to select whether the particular packet is admitted to the network tunnel based on the flow in which the particular packet is comprised, as in claim 6; and dropping the particular packet if the flow currently has a threshold number of packets stored in the queue; and the control unit is configured to admit the particular packet for transmission via the network tunnel if the flow currently has fewer than the threshold number of packets stored in the queue, as in claim 7.

However, Gouriellec in the same field of endeavor of aggregated flow tunneling, discloses a method and system in which an inbound packet from an inbound traffic flow is identified as a first profile packet if the packet conforms to a first traffic flow profile, and identifying the packet as a second profile packet if the packet conforms to a second traffic flow profile. The packet conforms to the first traffic flow profile if the packet is transmitted within a committed bandwidth subscription for the flow, and conforms to the second traffic profile if the packet is transmitted outside the committed bandwidth subscription for the flow but within a conditional bandwidth subscription for the flow, such that during periods of network congestion, the first profile packet is stored in an area of a queue reserved for storing first profile packets and the second profile packet is discarded, see paragraph [0008]. Gouriellec further discloses dropping the packet based on the filling level of the queue, see paragraph [0039]. (Correspond to claimed limitations of claims 6 and 7).

Therefore, it would have been obvious to a person of ordinary skill in the art, at the time the invention was made to enhance the method/system of Liu in using the details of flow control of Gouriellec so to optimize the transmission bandwidth and to implement the service level agreement agreed upon by the plurality of subscribers. (Gouriellec [0027], and [0032]).

5.   Claim 11, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Bishard, US 2003/0165148.

Regarding claims 11, 12, Liu discloses examples of recovering lost packets comprises congestion control algorithms such as a slow start algorithm, a congestion avoidance algorithm, a fast transmit algorithm, and a fast recovery algorithm and other, similar algorithms, see paragraph [0048]. Liu doesn't specify the details of the algorithms such as controlling a usage level of the queue by adjusting a rate at which packets are removed from the queue, and admitting a particular packet for transmission via the network tunnel based on the usage level of the queue, as in claim 11; and reducing the rate at which packets are removed from the queue if the usage level of the queue exceeds a threshold usage level, as in claim 12.

However, Bishard discloses controlling a usage level of the queue by adjusting a rate (including reduction rate based on the queue usage level threshold) at which packets are removed from a queue, and admitting particular packets based on the usage level of the queue. See [0013] and [0040].

Therefore, it would have been obvious to a person of ordinary skill in the art, at the time the invention was made to use the admission control of Bishard in the method/system of Liu so to implement one of the congestion control algorithm of Liu. The advantage would be the ability of Liu' system to avoid congestion by dynamically controlling the available bandwidth and further ease the dropping of packets resulting in increased reliability of Liu method/system.

6.   Claims 34, 35, 53, 54, 65 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Brewer et al, US 2006/0062233.

Regarding claims 34, 35, 53, 54, 65 and 66, as indicated above, Liu discloses substantially all the limitations of respective parent claims 29, 48 and 60, Liu doesn't explicitly specify the steps of or instruction/ or means for identifying a flow of a plurality of flows being aggregated for transmission via the network tunnel, wherein the flow comprises a particular packet; and selecting whether the particular packet is admitted to the network tunnel based on the flow in which the particular packet is comprised, as in claims 34, 35, 53, and 65; or admitting a particular packet for transmission via the network tunnel dependent on the usage level of the queue, wherein the controlling the usage level of the queue comprises: adjusting a rate at which packets are removed from the queue.

Brewer discloses identifying a flow of a plurality of flows being aggregated for transmission over a link, each flow comprises packets wherein priority transmission is given based on the QoS flow in which a specific packet belong, and adjusting QoS

queues level utilization for transmission rate adjustments. See abstract, figure1, 2A-2D,

paragraph [0007], and   [0030].

Therefore, it would have been obvious to a person of ordinary skill in the art, at

the time the invention was made to use the teaching of Brewer applied to the flows of

Liu, the cache of Liu can be modified to incorporate the different QoS queues of Brewer

so that fair share of transmission bandwidth can be allocated to contending flows while

maintaining the service level guarantees and also increase the throughput of the

method/system of Liu (Brewer).

7.   Claims 31, 50, 62, and 63 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Liu in view of Banister, US 6,145,032. Hereinafter referred to as Liu

and Banister respectively.

Regarding 31, 50, 62, 63, Liu does not disclose sending a packet via a port

associated with the packet after removing a packet from the queue.

However Bannister discloses recirculating (claimed send(ing)) a packet via a port

associated with the packet after removing a packet from a queue. See figure 3, column

5, lines 16-37.

Therefore, it would have been obvious to a person of ordinary skill in the art to

reirculate packet to the port associated with the packet removed from the transmitter

queue in accordance with the teaching of Bannister in the system of Liu so that queued

packet awaiting retransmission can be retransmitted with minimum delay(Bannister).

Response to Arguments

8.   Applicant's arguments with respect to claims 1, 4-13, 29, 31-38, 48, 50-54, 60, 62-66 have been considered but are moot in view of the new ground(s) of rejection.

Examiner, after further review of Liu reference, realize that Liu alone teaches invention as claimed in claims 1, 4-5, 8-10, 13, 29, 32-33, 36-38, 48, 51-52, 60 and 64. Since the presented claims were not amended, and a new ground of rejection is used, this case is non-final.

Notes: Applicant had indicated the status of claims 67-71 as "withdrawn", however claims 69 and 71 were already cancelled in a previous action. Applicant is required to indicate the correct status of claims 67-71 in response to this office action.

Conclusion

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to AHMED ELALLAM whose telephone number is (571)272-3097. The examiner can normally be reached on 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi H. Pham can be reached on (571) 272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AHMED   ELALLAM/   /Chi H Pham/
Examiner, Art Unit 2416   Supervisory Patent Examiner, Art
8/29/09   Unit 2416